

P. 204 #11, 13, 16, 20*

P. 302 #9, 12, 13, 16*

#11. $(\$5 + 0.50x)(300 - 30x)$

$$\begin{array}{rcl} \downarrow & \text{or} & \downarrow \\ \frac{0.50x}{0.50} = \frac{-5}{0.5} & & \frac{-30x}{-30} = \frac{-300}{-30} \end{array}$$

$$x = -10$$

$$x = 10$$

axis of symmetry:

$$x = \frac{-10 + 10}{2}$$

$$x = 0$$

Sub $x=0$ into equation

$$= (\$5 + 0.50(0))(300 - 30(0))$$

$$= 1500 \text{ Revenue}$$

∴ the cover charge should stay at \$5.00

#13. $C = 0.06t^2 - 0.27t + 5.36$

$$\begin{aligned} x &= \frac{-b}{2a} \\ &= \frac{-(-0.27)}{2(0.06)} \\ &= 2.25 \end{aligned}$$

Sub $x=2.25$ into equation

$$\begin{aligned} C &= 0.06(2.25)^2 - 0.27(2.25) + 5.36 \\ &= 5.05625 \end{aligned}$$

a) 1997

$$\begin{aligned} b) &= 0.06(3)^2 - 0.27(3) + 5.36 \\ &= 5.09 \end{aligned}$$

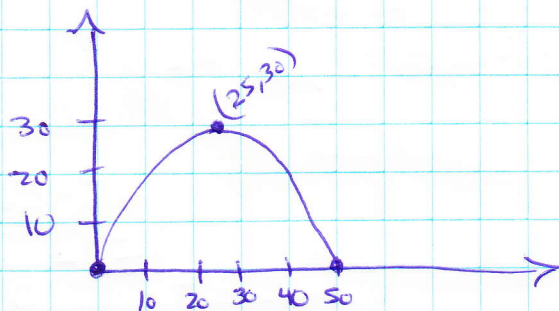
$$\begin{aligned} c) &= 0.06(15)^2 - 0.27(15) + 5.36 \\ &= \$14.81 \end{aligned}$$

$$d) y = 0.06(t - 2.25)^2 + 5.05625$$

#16

$$y = a(x-25)^2 + 30$$

$$y = -\frac{6}{125}(x-25)^2 + 30$$



sub (0,0) into equation to solve for a

$$y = a(x-25)^2 + 30$$

$$0 = a(0-25)^2 + 30$$

$$-30 = a(0-25)^2$$

$$\frac{-30}{625} = \frac{625a}{625}$$

$$\boxed{a = -\frac{6}{125}}$$

$$25 + 8 = \boxed{33} \rightarrow \text{sub in}$$

$$y = -\frac{6}{125}(x-25)^2 + 30$$

$$y = -\frac{6}{125}(33-25)^2 + 30$$

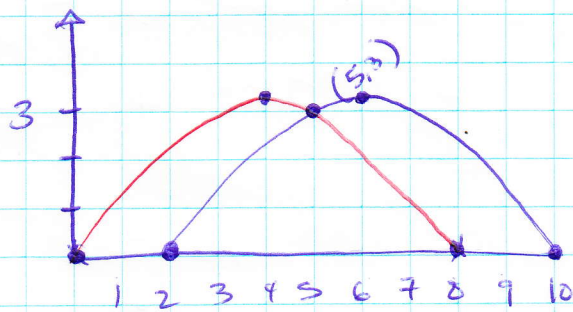
$$y = -\frac{6}{125}(8)^2 + 30$$

$$= -3.072 + 30$$

$$\boxed{= 26.93}$$

∴ it will not fit because at 33m or 17m the arch is only 26.93m tall and the mast is 27m.

#20



$$y = ax(x-8)$$

sub (5,3) into equation

$$3 = a(5)(5-8)$$

$$3 = a(5)(-3)$$

$$\frac{3}{-15} = \frac{-15a}{-15}$$

$$a = -\frac{1}{5}$$

Left water stream

$$a) y = -\frac{1}{5}x(x-8)$$

$$\begin{array}{cc} \downarrow & \downarrow \\ x=0 & x=8 \end{array}$$

axis of symmetry

$$x = \frac{0+8}{2}$$

$$x = 4$$

sub x=4 into equation

$$y = -\frac{1}{5}(4)(4-8)$$

$$= -3.2 \text{ m}$$

$$y = a(x-2)(x-10)$$

sub (5,3) into equation

$$3 = a(5-2)(5-10)$$

$$3 = a(3)(-5)$$

$$\frac{3}{-15} = \frac{-15a}{-15}$$

$$a = -\frac{1}{5}$$

Right water stream

$$y = -\frac{1}{5}(x-2)(x-10)$$

$$\begin{array}{cc} \downarrow & \downarrow \\ x=2 & x=10 \end{array}$$

axis of symmetry:

$$x = \frac{2+10}{2}$$

$$x = 6$$

sub x=6 into equation

$$\begin{aligned} y &= -\frac{1}{5}(6-2)(6-10) \\ &= -\frac{1}{5}(4)(-4) \\ &= -3.2 \text{ m} \end{aligned}$$

#9.

$$y = a(x-4)^2 - 5$$

$$7 = a(0-4)^2 - 5$$

$$\frac{12}{16} = \frac{16a}{16}$$

$$\boxed{a = \frac{3}{4}}$$

y-intercept (0,7) Vertex (4,-5)

$$y = \frac{3}{4}x^2 + bx + 7$$

$$-5 = \frac{3}{4}(4)^2 + b(4) + 7$$

$$-5 = 12 + b(4) + 7$$

$$-12 - 5 - 7 = 4b$$

$$\frac{-24}{4} = \frac{4b}{4}$$

$$\boxed{b = -6}$$

$$\#12. h = -5t^2 + 9t + 1$$

$$t = \frac{-b}{2a}$$

$$= \frac{-(9)}{2(-5)}$$

$$= \frac{9}{10}$$

sub $x = \frac{9}{10}$ into equation

$$h = -5\left(\frac{9}{10}\right)^2 + 9\left(\frac{9}{10}\right) + 1$$

$$h = 5.05$$

∴ the max height is 5.05m.

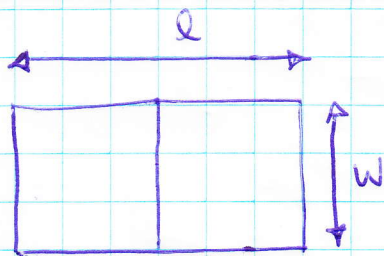
$$\#13. P = -30t^2 + 450t - 790$$

$$t = \frac{-b}{2a}$$

$$= \frac{-(450)}{2(-30)}$$

$$= 7.5$$

∴ \$7.50 will max daily profits.



$$= \$3000 \div \$5/\text{m}$$

$$= 600 \text{ m}$$

isolate for l

$$\frac{2l + 3w}{2} = \frac{600}{2}$$

$$l + \frac{3}{2}w = 300$$

$$l = -\frac{3}{2}w + 300$$

$$l = -1.5w + 300$$

$$A = l \times w$$

$$= w(-\frac{3}{2}w + 300)$$

$$= -\frac{3}{2}w^2 + 300w$$

OR

$$= -1.5w(w - 200)$$

$$w = 0$$

$$w = 200$$

$$w = -\frac{b}{2a}$$

$$= \frac{-300}{2(-\frac{3}{2})}$$

$$= 100$$

axis of symmetry:

$$w = \frac{200 + 0}{2}$$

$$w = 100$$

sub $x = 100$ into equation

$$2l + 3(100) = 600$$

$$2l = 600 - 300$$

$$\frac{2l}{2} = \frac{300}{2}$$

$$l = 150$$

$$A = 100 \times 150$$

$$A = 15000 \text{ m}^2$$